

Remarks

Claim 1-33 are pending in this application.

A Petition for a three-month extension of time and the corresponding fees are enclosed with this paper.

I. Response to Rejections under 35 U.S.C. § 112, Second Paragraph

A. Legal Standards under 35 U.S.C. 112, Second Paragraph

The second paragraph of 35 U.S.C. § 112 is directed to requirements for the claims:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

There are two separate requirements set forth in this paragraph:

(1) the claims must set forth the subject matter that the applicants regard as their invention; and (2) the claims must particularly point out and distinctly define the metes and bounds of the subject matter that will be protected by the patent grant.

MPEP § 2171.

With respect to the second requirement under 35 U.S.C. § 112, second paragraph:

The examiner's focus during examination of claims for compliance with the requirement for definiteness . . . is whether the claim meets the threshold requirements of clarity and precision, not whether more suitable language or modes of expression are available. . . . [The examiner] should allow claims which define the patentable

subject matter with a reasonable degree of particularity and distinctness. . . . The essential inquiry pertaining to this requirement is whether the claims set out and circumscribe a particular subject matter with a reasonable degree of clarity and particularity. Definiteness of claim language must be analyzed, not in a vacuum, but in light of (1) the content of the particular application disclosure, (2) the teachings of the prior art, and (3) the claim interpretation that would be given by one possessing the ordinary level of skill in the pertinent art at the time the invention was made. If the scope of the invention sought to be patented cannot be determined from the language of the claims with a reasonable degree of certainty, a rejection of the claims under 35 U.S.C. 112, second paragraph is appropriate. *In re Wiggins*, 488 F.2d 538, 179 USPQ 421 (CCPA 1973).

MPEP § 2173.02 (emphasis in original); *In re Moore*, 169 U.S.P.Q. 236, 238 (C.C.P.A. 1971); *Hybritech Inc. v. Monoclonal Antibodies, Inc.*, 231 U.S.P.Q. 81, 94 (Fed. Cir. 1986); *Shatterproof Glass Corp. v. Libbey Owens Ford Co.*, 225 U.S.P.Q. 634, 641 (Fed. Cir. 1985). Further, breadth of a claim is not to be equated with indefiniteness. *In re Miller*, 441 F.2d 689, 169 U.S.P.Q. 597 (C.C.P.A. 1971). For example, if a claim is too broad because it is not supported by the original description or an enabling disclosure, then a rejection under 35 U.S.C. § 112, first paragraph, is appropriate. Moreover, it has long been recognized that there is nothing inherently wrong with using functional language in drafting patent claims. The practical necessity of using functional language in certain circumstances has been recognized by the courts. *In re Swinehart*, 439 F.2d 210, 169

U.S.P.Q. 226, 228 (C.C.P.A. 1971) (citing *In re Halleck*, 421 F.2d 911, 164 U.S.P.Q. 647 (C.C.P.A. 1970)). "A functional limitation must be evaluated and considered, just like any other limitation of the claim, for what it fairly conveys to a person of ordinary skill in the pertinent art in the context in which it is used." MPEP § 2173.05(g).

B. Analysis

1. Claims 1-25

Claims 1-25 were rejected under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter that Applicant regards as the invention. More particularly, these claims were rejected for allegedly being unclear as to the meaning of "simultaneously injecting an aqueous slurry comprising an optional proppant and a solid-phase or nonaqueous-phase treatment agent."

Applicant respectfully submits that the indicated phrase defines a portion of the patentable subject matter with a reasonable degree of particularity and distinctness. The scope of the invention sought to be patented can be determined from the language of the claims with a reasonable degree of certainty in light of (1) the content of the specification, (2) the teachings of

the prior art, and (3) the claim interpretation that would be given by a person of ordinary skill in the art.

It would be obvious to a person of ordinary skill in the art from the parallel and adjectival use of "solid-phase" and "nonaqueous-phase" that these terms refer to the treatment agent. Therefore, the treatment agent can either be a solid-phase treatment agent or a nonaqueous-phase treatment agent. The aqueous slurry comprises "an optional proppant and a solid-phase or nonaqueous-phase treatment agent." Therefore, the proppant may be present in the aqueous slurry, or the proppant may be absent from the aqueous slurry, however, the treatment agent must be present in the aqueous slurry. A person of ordinary skill in the art would also understand that it is the aqueous slurry that is injected. The term "simultaneously" implies that two or more things must happen at the same time. Since only one thing is injected, i.e., the aqueous slurry, the only things that can happen at the same time are the fracturing and the injecting.

The specification instructs at page 5, lines 21-22, that in one illustrative embodiment of the invention the network of fractures is partially filled "with an aqueous slurry comprising an optional proppant and a solid phase electron donor." Example 2, beginning at page 16, line 10, describes a laboratory experiment for determining the carrying capacity of a fracture slurry

comprising 20-40 mesh size chitin (i.e., the treatment agent) and 20-40 API specification frac sand (i.e., the proppant). Example 3, beginning at page 18, line 4, describes a field test of fracturing a low permeability formation and injecting an aqueous slurry containing sand (i.e., proppant) and chitin (i.e., treatment agent).

Therefore, Applicant respectfully submits that claims 1-25 are in conformity with Section 112, second paragraph, and withdrawal of the rejection is respectfully requested.

2. Claims 4, 7, 19, and 26-33

Claims 4, 7, 19, and 26-33 were similarly rejected. More particularly, these claims were rejected for using the terms "low permeability" and "high viscosity." Applicant respectfully submits that these are terms used in the art of environmental remediation, and they are understood by those of ordinary skill in that art. For example, U.S. Patent No. 5,560,737 (hereinafter, "Schuring") uses the term "low permeability" in claim 7, which reads in pertinent part: "A method for synergistically reducing or eliminating the non-naturally occurring, subsurface, liquid contaminants from one or more soil formations having low initial permeability" See also, column 3, line 24; column 4, lines 10-18; column 4, lines 58-62; column 6, line 66, through column 7,

line 3; column 7, lines 41-45; column 7, lines 59-63; column 12, line 28-32; and column 19, lines 12-16, for example.

Similarly, "high viscosity" is a term understood in the art, and a person of ordinary skill in the art would be able to interpret the meaning of it.

Therefore, Applicant respectfully submits that claims 4, 7, 19, and 26-33 are in compliance with Section 112, second paragraph. Accordingly, withdrawal of the rejection is respectfully requested.

II. Response to Rejections under 35 U.S.C. § 102

A. Legal Standards under Section 102

Before discussing rejections based upon 35 U.S.C. § 102, it is believed proper to state that to sustain a rejection under § 102 the Patent and Trademark Office must abide by the following statement of the law.

Under 35 U.S.C. § 102, anticipation requires that each and every element of the claimed invention be disclosed in a prior art reference. *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1554, 220 USPQ 303, 313 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984). In addition, the prior art reference must be enabling, thus placing the allegedly disclosed matter in the possession of the public. *In re Brown*, 329 F.2d 1006, 1011, 141 USPQ 245, 249 (CCPA 1964).

Akzo N.V. v. U.S. Int'l Trade Comm'n, 1 U.S.P.Q.2d 1241, 1245 (Fed. Cir. 1986).

B. Analysis

Claims 1-9, 11-12, 14-21, and 23-24 were rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Schuring.

Schuring describes a method for reducing or eliminating liquid contaminants from soil formations. (Abstr.). The method consists of pneumatically fracturing the soil formation to product a fracture network, inserting a pressurized gas stream into the fracture network, and introducing liquid amendments into the gas stream. (Abstr.). The liquid amendments are atomized such that they can be carried in the gas stream.

With respect to claims 1 and 14, Schuring fails to disclose injecting a slurry into a fracture network. A slurry is a thin mixture of an insoluble substance with a liquid. Random House Unabridged Dictionary 1802 (2d ed. 1993). Schuring merely discloses injecting an atomized liquid amendment in a gas carrier.

With respect to claims 2 and 15, Schuring fails to disclose hydraulic fracturing. Schuring is limited to pneumatic fracturing.

Schuring further fails to disclose: using a proppant of any type, much less sand (claims 5 and 17); injecting chitin (claims 6, 12, 18, and 24); a high-viscosity agent (claims 7 and 19); and injecting an electron donor (claims 11 and 23).

Therefore, Schuring fails to anticipate any of claims 1-9, 11-12, 14-21, and 23-24. Withdrawal of the rejection is respectfully requested.

III. Response to Rejections under 35 U.S.C. § 103

A. Legal Standards under 35 U.S.C. § 103

Before responding directly to the issues raised by the Office Action under Section 103, the legal foundation for sustaining such a rejection will be reviewed. Briefly, an applicant for a patent is entitled to the patent unless the application fails to meet the requirements established by law. 35 U.S.C. §§ 102, 103. It is the USPTO's duty to issue a patent or establish that the applicant is not entitled to a patent under the law. *In re Warner*, 154 USPQ 173, 177 (CCPA 1967), *cert. denied*, 389 U.S. 1057 (1968). Thus, the burden is on the USPTO to establish a *prima facie* case of obviousness. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). If no *prima facie* case of obviousness is established, then a rejection under Section 103 cannot properly be sustained. *In re Oetiker*, 24 U.S.P.Q.2d 1443 (Fed. Cir. 1992). If the USPTO establishes a *prima facie* case of obviousness, then the burden of production shifts to the applicant to provide appropriate rebuttal, although the burden of persuasion always remains with the USPTO. *Id.* Such rebuttal may include arguments, amendments, and/or

presentation of objective indicia of nonobviousness. However, such objective indicia are always relevant to a determination of nonobviousness whether or not a *prima facie* case of obviousness has been established. *Stratoflex Inc. v. Aeroquip Corp.*, 218 U.S.P.Q. 871, 879 (Fed. Cir. 1987). To establish a *prima facie* case of obviousness, the USPTO must show all of the limitations of the claimed invention in the prior art. *In re Ehrreich*, 200 U.S.P.Q. 504, 509-11 (C.C.P.A. 1979). The subject matter of the invention must be considered as a whole and through the eyes of a hypothetical person of ordinary skill, not expert skill, in the relevant art at the time the invention was made. *Connell v. Sears, Roebuck & Co.*, 220 U.S.P.Q. 193, 199 (Fed. Cir. 1983). References must also be considered as a whole, including subject matter that teaches away from the invention as well as subject matter that suggests the invention, and not for their isolated teachings. *Ashland Oil, Inc. v. Delta Resins & Refractories, Inc.*, 227 U.S.P.Q. 657, 669 (Fed. Cir. 1985). References may be combined if there is a suggestion, motivation, or incentive in the prior art to make such a combination. *In re Dillon*, 16 U.S.P.Q.2d 1897, 1901 (Fed. Cir. 1990) (en banc); *In re Jones*, 21 U.S.P.Q.2d 1941, 1943-44 (Fed. Cir. 1992). It is not permissible to use hindsight to pick and choose among isolated teachings in the art after first having read Applicant's application to learn the pattern of the

invention. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596, 1600 (Fed. Cir. 1988). Finally, all the facts in evidence are evaluated, and patentability is determined on the totality of the record. *In re Corkill*, 226 USPQ 1005, 1008 (Fed. Cir. 1985). Factual determinations made by the USPTO must be based on a preponderance of the evidence, and legal conclusions must be correct. *In re Caveny*, 226 USPQ 1, 3 (Fed. Cir. 1985).

Pursuant to established legal authority, patentability under 35 U.S.C. § 103 requires a four-step analysis, which involves determining (1) the scope and content of the prior art, (2) the differences between the prior art and the claimed inventions, (3) the level of skill in the art, and (4) the objective evidence of nonobviousness that may have been presented. *W.L. Gore & Assocs., Inc. v. Garlock, Inc.*, 220 U.S.P.Q. 303, 311, 314 (Fed. Cir. 1983). After all of these factors have been considered, the ultimate legal conclusion on the issue of obviousness must be reached. With the above background in mind the rejections under 35 U.S.C. § 103 will be discussed.

B. Analysis

1. Claims 1, 10, 13, 22, and 25-26

Claims 1, 10, 13, 22, and 25-26 were rejected under 35 U.S.C. § 103(a) as allegedly being obvious over Schuring in view of U.S. Patent Application Publication No. 20020020665 ("Sorenson").

The disclosure of Schuring is summarized above. Sorenson discloses enhancing bioremediation of ground water by adding an electron donor to the ground water.

The combination of Schuring and Sorenson fails to disclose or suggest injecting an aqueous slurry into a fracture network (claims 1 and 26). Schuring discloses injecting a gas carrier into a fracture network and adding an atomized liquid amendment to the carrier. Sorenson discloses injecting liquid electron donors into ground water. Therefore, the combination of Schuring and Sorenson fails to disclose or suggest each and every limitation of the presently claimed invention.

Claims 10, 13, 22, and 25 depend on either claim 1 or claim 14, both of which include the limitation of injecting an aqueous slurry into a fracture network. Since dependent claims incorporate by reference all of the limitations of their base claims and any intervening claims, these dependent claims are also not rendered obvious by the combination of Schuring and Sorenson.

Moreover, Schuring is drawn to injecting gas into the vadose zone, that is, into the zone above the water table. Sorenson, on the other hand, is drawn to injecting an electron donor into ground water. Therefore, the teaching, motivation, or incentive to combine these references appears to be absent.

Therefore, a *prima facie* case of obviousness has not been established. Withdrawal of the rejection is, accordingly, respectfully requested.

2. Claim 15

Claim 15 was rejected under 35 U.S.C. § 103(a) as allegedly being obvious over Schuring in view of U.S. Patent Application Publication No. 20040126190 ("Stegemeier").

The disclosure of Schuring was summarized above. Stegemeier discloses a method of removing contaminants from soil. (Abstr.). The method consists of withdrawing vapors from a vapor extraction well, estimating the amount of water vapor removed from the contaminated soil in the extracted vapors, and applying heat to the contaminated soil, thereby increasing the permeability of the soil.

The combination of Schuring and Stegemeier fails to disclose or suggest injecting an aqueous slurry into a fracture network. Schuring teaches injecting a gas carrier containing an atomized

liquid amendment, and Stegemeier teaches *removing* vapors from the soil.

Therefore, the combination of Schuring and Stegemeier fails to disclose each and every limitation of the presently claimed invention. Thus, a *prima facie* case of obviousness has not been established. Withdrawal of the rejection is respectfully requested.

3. Claims 26-33

Claims 26-33 were rejected under 35 U.S.C. § 103(a) as allegedly being obvious over Schuring in view of Sorenson, U.S. Patent No. 6,589,776 ("Harkness"), and Stegemeier.

The disclosures of Schuring, Sorenson, and Stegemeier were summarized above. Harkness suggests using chitin as an electron donor.

The combination of Schuring, Sorenson, Harkness, and Stegemeier fails to disclose or suggest injecting an aqueous slurry into a fracture network (claim 26). This combination of references also fails to disclose using a proppant (claim 26), particularly sand (claim 28). This combination also fails to disclose partially filling the fracture network by applying ultrasound (claim 30), using pulse injection (claim 31), or using jet injection (claim 33).

Therefore, the proposed combination of references fails to disclose each and every limitation of the presently claimed invention. Hence, a *prima facie* case of obviousness has not been established.

Further, the teaching, motivation, or incentive to combine these references appears to be absent. Schuring relates to pneumatic fracturing in the vadose zone and adding electron acceptors to a gas carrier. Sorenson relates to adding liquid electron donors to ground water. Harkness suggest using chitin as an electron donor. Stegemeier relates to heating soil for *removing* vapors from the soil, instead of treating contaminants *in situ*. The Office Action suggested that pneumatic and hydraulic fracturing are equivalent in view of Stegemeier. This is not true below the water table. One could not substitute hydraulic fracturing in the method of Schuring, because it would be inapposite to inject a gas carrier into a fracture network created by hydraulic fracturing. For this reason, Applicant respectfully submits that the required motivation, teaching, or incentive to combine these references is missing.

In view of the above, withdrawal of the rejection of claims 26-33 is respectfully requested.

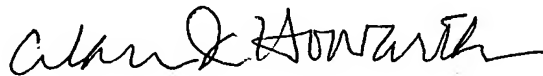
IV. Conclusion

Should the Examiner deem it advisable to conduct a telephone interview for any reason, the undersigned attorney would be most agreeable to receiving a telephone call to expedite the prosecution of the application.

For the reasons given above, Applicant respectfully requests reconsideration and allowance of Claims 1-33 and passage of this application to issue.

DATED this 14th day of September, 2006.

Respectfully submitted,



Alan J. Howarth, Ph.D.
Attorney Registration No. 36,553
Customer No. 020450

Clayton, Howarth & Cannon, P.C.
P.O. Box 1909
Sandy, UT 84091
Telephone: (801) 255-5335
Facsimile: (801) 255-5338